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(54) **Building or construction element, a construction manufactured making use of suchan element and a method of manufacturing such an element.**

(57) The invention relates to building or construction elements, having a core containing material contaminated or otherwise, possibly mixed with filling material, a curing material and/or foaming materials, which core is brought into a shape and is wrapped by a foil impermeable by moisture, made of, for instance, polytene, polypropene, polyester, polyvinyl chloride, bitumen etc.. In addition, such an element may be enclosed by a layer of curing material or solid material such as metal plate, or it may be incorporated in a mass of a curing material.

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Building or construction element, a construction manufactured making use of such an element and a method of manufacturing such an element.

The invention relates to a building or construction element, a construction manufactured making use of such an element and a method of manufacturing such an element.

The manufacture of building or construction elements is often based on a mechanical strength that renders such an element suitable for serving as a building or foundation element.

Nowadays, besides mechanical strength, it is necessary that a building or construction element should neither contain undesired pollutants nor emit those, or cause them to lixiviate.

A requirement very important in actual practice is that such an element can be manufactured at an acceptable cost price.

In accordance with the invention such a building or construction element is provided for, the core of the element, which contains a material with a granular or particulate structure, being wrapped by a foil impermeable by moisture.

Generally, such an element will be less strong than for example a building brick, but, with respect to the prevention of leaching (or the building of a waterproof, for example underground, construction) it is of great value at a low cost price.

As such an element in practice causes no, or hardly any, leaching, it is provided in accordance with a further elaboration of the invention that the core material contains waste material. Since waste materials often have a negative value, the cost price can be considerably reduced this way.

Although the invention is basically suitable for any waste material, such as, for instance, contaminated sand or rubble, the objective in accordance with a further elaboration of the invention is in particular that the waste material contains dehydrated sludge, such as paper sludge, sludge from water purification plants and sewage sludge, and/or reduced wood waste and/or manure, either dried or not, etcetera.

Likewise it is possible to provide the core with a binding agent, such as glue, plaster or cement. This enhances the mechanical strength of the core, a porous structure being no longer a disadvantage because the foil ensures the core being sealed off from the environment.

Besides pollutants, the core may also contain fillers such as sand and grit.

In many cases it is desirable to condition the core material, in particular the waste material present, by, for example, dehydration.

It is also possible to add foam plastic, such as substances from which polystyrene foam is produced, to the core.

It is often possible to give the element an improved form retainment by providing for an underpressure in the core material.

Building or construction elements in accordance with the invention may be applied in many ways, for example as heat and sound insulating covering of walls and noise barriers. In addition, a higher degree of fire resistance and a better form retainment may be obtained by providing, in accordance with a further elaboration of the invention, that the element is enclosed by a covering of a synthetic material or a curing material such as cement, concrete or plaster. In this case, it is possible to apply the covering of synthetic or curing material direct around the core and then wrap the foil around it, as well as to apply the covering outside the foil.

The foil may be made of various materials suitable for the purpose, such as polytene, polypropylene, polyester and/or bitumen, for example a bitumen layer applied to a fibrous web made of a synthetic such as polytene. It will be clear, however, that any material that is suitable for wrapping the core and is impermeable, may be selected as a foil.

When manufacturing an element in accordance with the invention it may be provided that a foil by means of vacuum forming is brought into a spacial shape, such as a bowl or bag, that the core material is put in, and that subsequently the foil is sealed .

In that case it can in particular be provided that, prior to sealing, the core material is brought under sub-atmospheric pressure. It is also possible to compress the core material.

A building or construction element in accordance with the invention can not only be strengthened externally, for example by using concrete or a layer of plaster, but it is also possible to incorporate such an element into a construction frame and then to cover it with, for instance, metal plate.

Sealing and protection of an element in accordance with the invention can be further improved by covering the outside with tar, or with bitumen that may be part of a ready available polyester fibre mat or rockwool wall provided with a bitumen layer.

A favorable embodiment of the invention for processing wood waste is constituted in that wood chips are reduced to particles somewhat coarser than the usual saw dust, and that said particles are mixed with water containing a little glue and to which cement is added. In this case it is possible to add base materials for polyurethane foam as well. Such an element is light and strong and has good sound absorbing properties.

Another unexpected advantage is, for example, the possibility of mixing moist manure with sand, the compression of said mixture and its being wrapped by a foil, so that rectangular blocks can be obtained that are excellent to serve as material for improving terrain or raising land surfaces.

An entirely different application of the elements in accordance with the invention is their incorporation

into caissons or other immersible elements. Many embodiments of the invention provide elements with a density higher than that of water, so that the application to caissons or other immersible elements provides an extremely safe and cheap waste disposal.

In this respect it should be pointed out that, should an element in accordance with the invention become leaky at all, this one single element will hardly cause undesired pollution. Moreover, the fact is that a material largely sealed off, will lixiviate only very slowly, so that the formation of dangerous concentrations is practically ruled out.

Another application is to the construction of a virtually impermeable partition in dikes.

When applying the invention to noise barriers, the additional sound absorption is a favorable property. In case of such noise barriers, it is often desired to provide the elements in accordance with the invention with a sturdy cover layer, for example cement, in order to make them completely wind and weather proof.

When applying the invention to industrial plants the combination of sound absorption and thermal insulation may have great advantages, for instance by mounting elements in accordance with the invention against a wall.

An outstanding application of the invention is constituted in that already dumped waste material can be sorted once again on dumps and the like, and that it can be exploited in a significantly useful way while reducing the total soil and ground water pollution.

Claims

1. Building or construction element, **characterized in that** a core containing a material with a granular or particulate structure, is wrapped by a foil impermeable by moisture.

2. Building or construction element as claimed in claim 1, **characterized in that** the core material contains waste material.

3. Building or construction element as claimed in claim 2, **characterized in that** the waste material contains dehydrated sludge, such as paper sludge, sludge from water purification plants and sewage sludge, and/or reduced wood waste and/or sand or grit, whether or not contaminated.

4. Building or construction element as claimed in any of the preceding claims, **characterized in that** the core contains a binding agent, such as glue, plaster or cement.

5. Building or construction element as claimed in claims 1 - 4, **characterized in that** the core contains fillers such as sand or grit.

6. Building or construction element as claimed in claims 1 - 5, **characterized in that** the waste material is conditioned, in particular dehydrated.

7. Building or construction element as claimed in any of the preceding claims, **characterized in that** the core has a foam structure.

8. Building or construction element as claimed in any of the preceding claims, **characterized in that** inside the foil there is an underpressure.

9. Building or construction element as claimed in any of the preceding claims, **characterized in that** it is wrapped by a covering of a synthetic material or a curing material such as cement, concrete or plaster.

10. Building or construction element as claimed in any of the claims 1-9, **characterized in that** it is wrapped by a covering that, for instance, may consist of any of the following materials: polytene, polypropene, polyester, polyvinyl chloride, or bitumen or tar, bitumen or tar being optionally applied to a fibre web consisting of, for example, polytene, polypropene, polyester or polyvinyl chloride.

11. Building or construction element as claimed in claim 9 or 10, **characterized in that** the covering is situated outside the foil or that the element is enclosed by a mounted construction of plate material, such as steel or aluminum.

12. Construction provided with embedding material such as, for example, plaster, sand, cement or concrete, **characterized in that** one or more building or construction elements as claimed in any of the claims 1 - 11 are incorporated in the embedding material.

13. Method of manufacturing a building or construction element as claimed in claims 1 - 10, **characterized in that** a foil by means of vacuum forming is brought into a spacial shape, that the core material is put in and that the foil is sealed.

14. Method as claimed in claim 13, **characterized in that,** prior to sealing, the core material is brought under sub-atmospheric pressure.

15. Method as claimed in claim 13 or 14, **characterized in that,** prior to sealing, the core material is compressed.

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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 0007

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	EP-A-0 453 620 (HOHENLEITNER) * column 6, line 48 - column 9, line 57; figures *	1,2,4,5, 9,11,12	E04C2/16 E04C1/40
A		10	
X	WO-A-92 04301 (OWENS-CORNING FIBERGLAS) * page 4, line 32 - page 6, line 32; figure 1 *	1,5,8	
A		13,14	
X	GB-A-2 024 888 (ANGUS FERGUSON) * the whole document *	1,2,4	
A		3,10,15	
A	US-A-3 733 675 (DIEDERICH) * the whole document *	1,2	
A	US-A-4 586 958 (MATSUURA) * claims *	2-5,7	
A	FR-A-2 606 668 (THARRAULT) * claim 1 *	2,3,5,6	TECHNICAL FIELDS SEARCHED (Int.Cl.5) E04C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 April 1994	VandeVondele, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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